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ABSTRACT

This report reviews the research on text-based interest, defined as those elements within texts that create interest for the majority of readers. Three issues are covered: (1) what kinds of information are considered interesting, both theoretically and empirically; (2) what effects popular strategies for creating interest have on learning outcomes; and (3) how interest influences where students focus their attention in a text. A major finding of the report is that the practice of adding personalized anecdotes and highly interesting but nonessential information to text has a detrimental effect on the learning of important information. The report concludes with suggestions for alternative strategies for creating interest in texts, for educational practice, and for future research. Two tables of data are included, and 62 references are attached. (Author/SR)

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Technical Report No. 506

HOW INTEREST AFFECTS LEARNING FROM TEXT

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August 1990

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Abstract

This report reviews the research on text-based interest, defined as those elements within texts that create interest for the majority of readers. Three issues are covered: (a) what kinds of information are considered interesting, both theoretically and empirically; (b) what effects popular strategies for creating interest have on learning outcomes; and (c) how interest influences where students focus their attention in a text. A major finding of the review is that the practice of adding personalized anecdotes and highly interesting but nonessential information to texts has a detrimental effect on the learning of important information. The report concludes with suggestions for alternative strategies for creating interest in texts, for educational practice, and for future research.

HOW INTEREST AFFECTS LEARNING FROM TEXT

Recently, a great deal of concern has been voiced about students' lack of basic knowledge, or "cultural literacy" (cf., Bloom, 1987; Hirsch, 1987; Ravitch & Finn, 1987). At the same time, textbooks--a major conveyor of knowledge in schools--have been widely criticized as being poorly written, superficial, watered down, and uninteresting (Anderson, Hiebert, Scott, & Wilkinson, 1985; Armbruster, 1984; Beck, McKeown, & Gromoll, 1989; Bowen, 1984; Fiske, 1984; Larkin, Hawkins, & Gilmore, 1987; Solozano, 1986; Tyson & Woodward, 1989). Therefore, it is not surprising that researchers, educators, and now the news media have been asking how texts can be written in ways that both facilitate learning and inspire students.

Much of the research investigating how text characteristics affect comprehension has focused on text structure--that is, the logical connections among ideas as well as the subordination of some ideas to others (Meyer & Rice, 1984). As a result of the research on text structure, we know that older and good readers are better able than younger and poorer readers to identify and use an author's structure, to discriminate important from unimportant information, to remember key ideas, and to recall information in an organized manner (cf., Brown & Smiley, 1977; 1978; Meyer, Brandt, & Bluth, 1980; Smiley, Oakley, Worthen, Campione, & Brown, 1977).

In addition to increasing our basic understanding of the reading process, the research on structural importance has produced practical results for designing texts and improving instruction. For example, we now know how to design texts to make their structure and organization easier to follow. Armbruster (1984) has described four characteristics of texts that make them more *considerate* to the reader: (a) using the most appropriate structure for presenting the text's content (e.g., comparison/contrast, temporal sequence, cause-and-effect); (b) giving the reader information about text structure by means of signals (e.g., introductions, headings, and typographic cues), which also indicate which ideas are important (Meyer, 1979); (c) making clear how words, clauses, sentences, and ideas are related to one another by means of causal connectives such as *in contrast* and other types of cohesive ties; and (d) providing enough examples, details, analogies, and other kinds of elaborations to make the content meaningful to the reader. However, elaborations must be used discriminately because excessive use of details, especially when they are unrelated to the main ideas, has been found to interfere with the learning of important information (Bradshaw & Anderson, 1982; Mohr, Glover, & Ronning, 1984; Reder & Anderson, 1980).

As a result of the research on structural importance, we also know a good deal about teaching students how to follow the text's structure, allocate attention to important information, and organize information for easier retrieval. For example, we know that teaching students how texts are conventionally organized in different domains and how to identify a text's structure facilitates recall (cf., Bartlett, 1978; Taylor & Beach, 1984). We also know how questions can be used to direct students' attention to important information (cf., Andre, 1979; Gall, Ward, Berliner, Cohen, Winne, Elashoff, & Stanton, 1978; Reynolds & Anderson, 1982). Finally, we know a good deal about teaching students how to represent the hierarchical organization of information in a text through mapping, or schematizing, outlining, and other techniques (cf., Cook & Mayer, 1983; Holly & Dansereau, 1984).

Only in the last few years have researchers begun to address another central issue in text comprehension--the role of interest. Earlier work in this area tended to examine the effect of personal preference, or topic interest, generally finding that having a high interest in the content of a passage facilitates reading comprehension (cf., Asher, Hymel, & Wigfield, 1978; Baldwin, Peleg-Bruckner, & McClintock, 1985; Belloni & Jongsma, 1978; Stevens, 1980). More recently, researchers have begun to investigate how comprehension and learning are affected by *text-based interest*--elements within texts that create interest for the majority of readers (Hidi & Baird, 1986, 1988). This new research emphasis is timely because publishers are being exhorted to produce texts that are more lively, personal, vivid, and

dramatic--in other words, more interesting. For example, Tyson and Woodard (1989) call for authors of textbooks to be those who can write "in the style used by skillful popularizers" (p. 17). Another textbook critic argues that "all good writing has a human voice and makes use of strong verbs, vivid anecdotes, lively quotations, and other literary devices" (Sewall, 1988, p. 557). However, as this chapter will show, research has found that some popular strategies for creating interest may not facilitate--and may even interfere with--the learning of important information.

The purpose of this report is to review the research on text-based interest, in the hope that we can ultimately develop strategies that not only make texts more interesting but also make important information more memorable. Toward this end, three questions will be addressed. First, what kinds of information in a text are interesting, particularly to students, the consumers of these texts? Perhaps some writers and textbook publishers have too narrowly defined interest, thus limiting themselves to interest-evoking strategies that may actually interfere with learning. Second, what effect does interest have on what students learn from text? That is, if information in a passage varies in terms of both interest and importance, what kinds of information are most likely and least likely to be remembered? The answer to this question will contribute toward our understanding of how interest interacts with importance to affect learning outcomes. Third, how does interest influence where students focus their attention in a text? We know from previous research that skilled readers selectively allocate cognitive resources such as attention to important information that is difficult to remember (Brown, Smiley, & Lawton, 1978; Masur, McIntyre, & Flavell, 1973). Do skilled readers also devote extra attention to interesting information? And, does interesting information require extra attention to be learned? The answer to these questions will further our understanding of how interest affects the strategic use of cognitive resources. The report concludes with a discussion of the implications of this body of research for writing expository curriculum materials, for educational practice, and for future research.

What Is Interesting in a Text

One way that writers have attempted to create interest in expository materials is by embedding within passages personalized anecdotes and highly interesting but nonessential details (Graves, Slater, Roen, Redd-Boyd, Duin, Furniss, & Hazeltine, 1988; Hidi, Baird, & Hildyard, 1982; Pearson, Gallagher, Goudvis, & Johnston, 1981). For example, one of the Time-Life editors in the Graves et al. study, who had been asked to revise passages taken from a history textbook, described his rationale for adding interesting but nonessential information this way: "To enrich the content, I inserted 'nuggets' gleaned from library sources. Nuggets are vivid anecdotes and details that remind us that PEOPLE, not events, make history. A Time-Life story is not so much a sequence of events as a string of nuggets" (p. 248). The following are examples of nuggets from the Time-Life revision of a passage about the Vietnam War: "They [the Vietcong] darted out of tunnels to head off patrols, buried exploding booby traps beneath the mud floors of huts, and hid razor-sharp bamboo sticks in holes" (p. 265). These are good examples of what Garner, Gillingham, and White (1989) have aptly termed *seductive details*--highly interesting but unimportant details. In this case, they evoke not only vivid images but also feelings of fear and perhaps anger.

The Time-Life editors seem to have achieved their goal of making the passages more interesting--at least for adults. For example, journalists, educators, and textbook writers generally considered the Time-Life versions more interesting than the original passages (Graves & Slater, 1989). Likewise, the researchers in the Graves et al. study (1988) appear to have found the Time-Life versions more interesting than those written by text linguists and college composition teachers, who had emphasized clarity and structural cohesion in their revisions. To quote the researchers, the revisions of the Time-Life editors "went beyond such matters [as organization and coherence] and were intended to make the texts interesting, exciting, vivid, rich in human drama, and filled with colorful language" (p. 249).

But, as Duffy, Higgins, Mehlenbacher, Cochran, Wallace, Hill, Haugen, McCaffrey, Burnett, Sloane, and Smith (1989) have pointed out, what adult writers consider interesting may not be what students find

interesting. Because students are the consumers of textbooks, it is worth investigating this issue from their point of view. Therefore, Duffy et al. had students rate the texts written by the Time-Life editors, composition teachers, and text linguists on two criteria: (a) how easy it was to learn the information in the texts, and (b) how enjoyable they were. The versions written by the composition teachers--not the Time-Life editors--received the highest ratings.

Although there was no consensus between the adults and students about which of the passages they preferred, there is consistency among theorists as to what makes information in a text interesting. For example, Schank (1979) argues that certain kinds of topics are inherently interesting. These include death, danger, chaos, destruction, disease, injury, power, money (in large quantities), sex, and romance--the usual content of nuggets and seductive details. Schank further argues that these topics can be made more or less interesting by two conditions. One is the unexpectedness of events--something is interesting in direct proportion to its abnormality or novelty. Therefore, *John entered the room by climbing through the window* should be more interesting than *John entered the room by coming through the door*, because the latter is the usual way that one enters a room. The other condition affecting interest is the degree to which readers can relate personally to the characters and events. This is the idea of character identification and vicarious experience, which can be enhanced by providing details. According to Schank, these two conditions are responsible for individual variation because the reader's experiences and cognitive structure determine the degree to which events are unexpected and the reader will become personally involved in the story.

Similar to Schank's theory, Anderson, Shirey, Wilson, and Fielding (1984) have identified three attributes that contribute to text-based interest: (a) character identification, (b) novelty, and (c) activity level. Like Schank, Anderson et al. argue that whether one can identify with a character in a story is to some degree affected by individual reader characteristics and by concreteness, the use of imagery, and other means of evoking emotional responses. Novelty, similar to Schank's notion of unexpectedness, enhances interest because ordinary happenings are presumably boring while unusual events can be exciting. Finally, activity level represents the idea that intense actions or feelings will be more interesting than descriptions of passive states or lack of action. This would predict that people would find the movie *Lethal Weapon II* more interesting than the movie *Charing Cross Road*, which charts the correspondence over several decades of two book lovers who never meet.

Kintsch's (1980) distinction between *emotional interest* and *cognitive interest* adds another dimension to the theory of interest. Emotional interest is aroused when events have a direct emotional impact--as sex and violence will usually have--and when stories invite a vicarious experience in the reader. Thus, emotional interest is similar to the notions of inherent interest and personal relatedness, or character identification. Cognitive interest, on the other hand, is quite different. One way to create cognitive interest is to have events unfold in an unusual or surprising way--referred to by the others as unexpectedness or novelty. Therefore, a happening or an outcome should not be too predictable, although the reader must be able to see how it fits into the text's overall structure. Thus, interest is also dependent on the cohesiveness of the text. As Kintsch notes, "the text as a whole must hang together and make sense to the reader, so that he is able to construct a coherent macrostructure in which each text unit has its place and is meaningfully related to other sections of the text" (p. 89).

According to Kintsch, cognitive interest is also a function of the reader's background knowledge--that is, interest tends to be low with little or no background knowledge, increases as more is known, and diminishes again as the reader's background knowledge reaches the point that nothing new can be learned from the passage. Finally, cognitive interest is affected by style. Something may be interesting not because of *what* is said but because of *how* it is said. For example, writers can increase cognitive interest by violating semantic rules, as poets often do, and by choosing unusual or vivid words. Of course, word choice can also affect the emotions. For example, when the Time-Life editors replaced weak verbs (e.g., *tried to get*) with strong ones (e.g., *tried to lure*) in the selection about the Vietnam War, they may have aroused feelings of fear and dread in the reader.

In addition to theories about what makes information in a text interesting, text-based interest has also been investigated empirically. The usual method has been to ask readers to rate text segments for both interest and importance in order to specify what kinds of information are interesting. With a few exceptions, important information in expository texts tends to be rated as uninteresting, and interesting information tends to be rated as unimportant (Garner, Brown, Sanders, & Menke, in press). For example, Hidi et al. (1982) found no relationship between interest and importance in expository texts, which emphasized facts, explanations, and/or instructions; in fact, their subjects rated few ideas as interesting at all. In mixed texts (expository material containing narrative anecdotes), only the anecdotes were considered interesting--but again they were unimportant. Only in narrative texts were interest and importance found to be highly related. Similarly, Garner et al. (1989) found that adults rated seductive details in expository texts as very interesting but not at all important; in contrast, main ideas were rated as very important but not at all interesting.

Drawing on these findings, we (Wade & Adams, in press) designed an experiment to examine the relationship between interest and importance in biography, because this genre is expository in nature but narrative in structure. Like a narrative, a biography deals with living beings and usually has a chronological order as it describes the events of a person's life. Like an exposition, the biographical passage used in this study also includes descriptions of historical events and explanations of their causes and consequences.

In our study, 52 college students were asked to rate sentences in a lengthy biographical sketch of Horatio Nelson for interest and importance. Subjects were randomly assigned to one of two counterbalanced conditions--rating for interest first or rating for importance first. Subjects were first given the text in manuscript form and asked to read it for a general understanding. Then they were given the text divided into segments of one sentence in length, each followed by a 4-point scale (1, not at all interesting, or important; 4, very interesting, or important). Using this rating scale, subjects first identified one-quarter of the total number of sentences they considered the least interesting (or important). They then repeated this procedure, with the rating progressing from least to most interesting (or important), until they had rated all the sentences.

When the interest and importance ratings were combined, four categories resulted. The categories with the most sentences were high interest/high importance (43) and low interest/low importance (41); only 13 sentences were classified as high interest/low importance and 15 as low interest/high importance. Thus, interest and importance were found to be highly related in this biographical passage, as Hidi et al. (1982) had found for narratives. A content analysis was then conducted to examine what characteristics distinguished the sentences in each category.

The category of high interest/high importance contained the *main ideas* of the passage--that is, the key, subsuming, and abstract concepts. Specifically, these were descriptions of the major historical events; explanations of their causes, outcomes, and historical significance; and descriptions of Nelson's attributes that were responsible for his success. Perhaps because the text is a biography, elements of narration, suspense, and unexpectedness as well as personal relatedness are associated with many of these main ideas. Two examples are presented below:

1. It was his knowledge of navigation and his talent for getting along with his men that helped him to rise so rapidly in the service.

2. The Battle of Trafalgar was the greatest naval victory in British history, and it won the war for Great Britain.

The category of high interest/low importance covered topics that have many of the properties of absolute interest, embellished as well with vividness, concreteness, novelty, and personal relatedness. Specifically, they were details of Nelson's injuries, his love life, and his death--concepts that are

inherently interesting but are unrelated to the key ideas of the passage. Thus, they will be referred to in this report as *seductive details*. The following are examples:

1. During the battle, Nelson's right arm was badly mangled up to the elbow.

2. She [Lady Emma Hamilton] fell in love with the battered, one-eyed, one-armed naval hero and became his mistress.

However, not all information rated as important in this text was rated as interesting. The category of low interest/high importance consisted of factual details related to the main ideas; thus, they will be referred to as *important factual details*. These were mainly the details of the major historical events described in the passage and of Nelson's role in them. They are important because they represent the what, when, where, and how of events that embellish our understanding of them. They may be lacking in interest because they do not refer to topics having direct emotional appeal; furthermore, they do not include the conditions of unexpectedness (or novelty) and personal relatedness (or character identification) posited by the models of text-based interest. This is apparent from examples of sentences in this category:

1. Nelson first distinguished himself by blockading Toulon, a port city on the coast of France, and capturing Corsica.

2. Nelson led a small landing party in an attack on the strongly fortified port of Santa Cruz de Tenerife in the Canary Islands.

Finally, information that was rated as low interest/low importance consisted primarily of common, everyday facts or events found in any biography, which have nothing to do with the main ideas and do not meet the criteria of inherent interest or unexpectedness. For the sake of economy, these will be referred to as *boring trivia*. Two examples are:

1. His father was rector of the local church, and his mother was a member of the Walpole family.

2. During a brief ceasefire in the war, Nelson lived in England in a country house he had bought in 1801.

In summary, a consistent finding in the research literature is that vivid, personalized, dramatic details and anecdotes will be identified as interesting, as theories of interest would predict. Unfortunately, as seductive details, they are usually unimportant and unrelated to the main ideas of a text. Fortunately, there is also evidence that interest is not confined exclusively to seductive details. For example, Duffy et al. (1989) found that text versions written by composition teachers, which emphasized clarity and structural cohesion, were rated as more enjoyable than the Time-Life versions, which relied heavily on seductive details and personalized anecdotes. Furthermore, main ideas may also be as interesting as seductive details to many readers in some texts. So far, this appears to be true of narrative texts (Hidi et al., 1982) and of biography (Wade & Adams, in press). In the biographical passage, descriptions of major historical events and explanations of causes and outcomes were rated as interesting.

Effects of Interest on What Is Learned

Popular wisdom holds that if we can find ways to make texts more interesting, students will be motivated to read them and consequently will learn more. This belief is expressed in the following quote by a journalist: "The Time-Life editors spice the descriptions with details, such as 'swarms of buzzing insects' and traps filled with 'razor-sharp bamboo sticks.' In contrast to the detached style of the original passage, this technique helps the reader see what happened. This, in turn, creates a more memorable

passage because the reader has images to fall back on" (Graves & Slater, 1989, pp. 13-14). However, some educators have questioned whether the Time-Life editors' techniques for making expository texts more interesting will, in fact, make their content more memorable. As one educator put it, "Would students learn more--over the long haul--from a text if it were written in 'Timese'? I doubt it" (Graves & Slater, 1989, p. 18).

Research findings support this educator's skepticism. Although Graves et al. (1988) initially found that the Time-Life versions were recalled better than the versions written by either the text linguists or the composition teachers, other researchers who have attempted to replicate Graves et al.'s findings using the same materials have found quite the opposite to be true. Using more rigorous research designs, both Britton, Van Dusen, Gulgoz, and Glynn (1989) and Duffy et al. (1989) found that significantly more information was recalled from the composition teachers' versions than from any of the others. Later, in another replication, even Graves (1990) produced results favoring the composition teachers' versions.

These findings are consistent with the research on text-based interest, which has found that the practice of adding anecdotes and seductive details does not facilitate and may even interfere with the learning of important information. For example, Hidi and Baird (1988) found that adding interesting details and elaborations to highlight certain abstract or scientific concepts had no effect on the recall of those concepts, although the details themselves were well recalled. Similarly, Garner et al. (1989) found that inserting seductive details in a text significantly reduced the number of main ideas (although not the number of related details) that adults recalled. Seductive details had an even more detrimental effect on the recall of seventh graders, who not only recalled fewer main ideas but also fewer relevant details than a comparison group. Findings are also consistent with research investigating the effect of related and unrelated details on recall. Mohr, Glover, and Ronning (1984) found that the number of unrelated details in a passage was negatively correlated with the recall of major ideas, and Bradshaw and Anderson (1982) found that major ideas are recalled better when they are presented alone than when they are studied along with unrelated facts. In both studies, major ideas were recalled best when they were embellished with supporting details, added only to elaborate the main idea.

In our own research in this area (Wade & Adams, in press), we examined how interest and importance interact to affect what is learned because previous research has found both to be powerful predictors of learning. Results were expected to indicate which of the four categories of information (seductive details, main ideas, important factual details, or boring trivia) established in the rating study would be the most memorable and which the least. We also hypothesized that one reason poorer readers are less sensitive to structural importance (Meyer et al., 1980; Smiley et al., 1977) may be that they are more affected by the interestingness of information in a text than are good readers. Therefore, we expected that good readers would recall more important than interesting information, whereas poorer readers would recall more interesting than important information.

In this experiment, 48 college students, who were equivalent to the rating group, read the same text on Horatio Nelson and completed a free written recall task, either immediately following the reading (immediate recall) or one week later (delayed recall). We found that interest was a better predictor of recall than was structural importance for both ability groups. Although good readers remembered significantly more than did poor readers, there was no difference in their pattern of recall. The two kinds of information that had been rated as interesting in the rating study described earlier--seductive details and main ideas--were recalled significantly better by both groups than was uninteresting information. In fact, details supporting the main ideas, which had been rated as important but uninteresting, were least memorable. These were the results for both immediate and delayed *overall* recall, in which at least 25% of the idea units in a sentence were recalled. Results for *complete* recall, in which 66% or more of the idea units in a sentence were recalled, revealed a similar pattern, except that approximately as many main ideas as seductive details were recalled. (See Table 1 for overall recall results of both the immediate and delayed conditions.)

[Insert Table 1 about here.]

In summary, interest has a powerful effect on recall for even skilled readers. Most memorable are seductive details. Unfortunately, the practice of adding them to texts to increase the memorability of important information does not seem to work and in some cases may be detrimental to that objective. However, when important information itself is interesting--as is frequently the case for main ideas in narratives and biography--there is a greater likelihood that it will be remembered. The problem seems to be with purely expository information, which is usually considered by readers as uninteresting, as in the case of main ideas and supporting details in expository texts (e.g., Garner et al., 1989; Hidi & Baird, 1988) and of historically important factual details in biography (Wade & Adams, in press). Clearly, strategies are needed to make these kinds of information more memorable and, if possible, more interesting.

Effects of Interest on Selective Attention

The findings just discussed raise the question of *why* some kinds of information are recalled better than other kinds. The theory of selective attention (Anderson, 1982) offers one explanation. This theory holds that the more attention a reader focuses on a text element, the better it will be recalled. In studies examining the effect of importance on selective attention strategies, this has certainly been found to be true. For example, in studies where certain kinds of information are made important by means of objectives (Rothkopf & Billington, 1979), adjunct questions embedded in the text (Reynolds, Standiford, & Anderson, 1979; Reynolds & Anderson, 1982), or text structure (Cirilio & Foss, 1980), expert readers have been found to allocate extra attention to important information and, because of this, learn more than younger and poorer readers.

But what happens to this seemingly linear, positive relationship among importance, selective attention, and learning when the variable of text-based interest is added? Because interesting information is often vivid, dramatic, suspenseful, and/or personalized, it may not require much effort to learn; at the same time, interest may attract a good deal of the reader's attention. If this is the case, then attention would appear to be an epiphenomenon—not the reason why interesting information is memorable. Therefore, if interesting information does not require extra attention to be learned, yet even skilled readers devote a good deal of attention to it, then they are not reading strategically. That is, they are not selectively allocating cognitive resources to where it is most needed to meet their learning goals. The problem is even greater if they devote extra attention to interesting information that is unimportant. Findings from the research described below that investigated the influence of interest on selective attention supports this hypothesis.

The influence of interest on where attention is directed and on subsequent action begins at an early age. Three- and four-year-old children are much more likely to shift their attention to interesting objects in their peripheral visual field than to objects they find less interesting (Renninger & Wozniak, 1985). Furthermore, they are more likely to recognize and recall objects they consider interesting as compared to uninteresting objects. In fact, three-year-olds can recall an interesting item placed in the medial position in a 9-item series better than objects in any of the other positions, despite the fact that the medial position is ordinarily the most difficult to recall. Only as children get older are they able to recall objects in other positions as well. For example, the four-year-olds in the Renninger and Wozniak study recalled the uninteresting item in the last position as well as the interesting item in the medial position, which may be evidence of the beginning of a rehearsal strategy (Renninger, in press). Thus, the pervasive influence of interest on information processing and recall seems to diminish with age, as children develop strategies for learning.

Yet, the strong influence of interest never disappears. Anderson et al. (1984) found that third and fourth graders allocated more attention to interesting sentences and recalled them better than uninteresting ones. In this study, children read a series of unrelated sentences that had been previously

rated for interest by an equivalent group of subjects. In addition to sentence recall, two measures of attention were collected. The first was reading time, a measure of attention duration, which assumes that the longer subjects spend reading a text element, the more attention they are allocating to it. Reading times were obtained by recording how long subjects spent reading sentences presented individually on a computer screen before they pressed a space bar on the keyboard to call up the next sentence. The second measure of attention was reaction time to outside stimuli, which reflects attention intensity. Reaction times were obtained by recording the amount of time it takes for subjects to respond to a tone periodically sounded in the earphones they were wearing. The assumption here is that the longer it takes subjects to respond, the more they are absorbed in reading the sentences. Results of a causal analysis indicated that attention was not a mediating variable between interest and learning. In other words, subjects could have learned the interesting sentences without allocating extra attention to them. Thus, paying as much or more attention to interesting sentences as to uninteresting ones does not seem to be an effective or efficient strategy.

In a follow-up study to investigate whether adults are more strategic than children in their selective attention strategies, Shirey and Reynolds (1988) found that they are. They had students read the same sentences, which had again been previously rated for interest--this time by an equivalent group of college students. Unlike the children in the Anderson et al. (1984) study, adults allocated less attention to interesting sentences, yet still recalled them better. Shirey and Reynolds concluded that mature readers are more strategic in how they allocate cognitive resources, giving more attention to information that cannot be easily remembered.

However, this finding may not hold for connected prose, in which sentences vary in both interest and importance. To find out, we (Wade & Schraw, 1990) examined the selective attention strategies of college students reading a revised version of the Horatio Nelson passage. Given the results of previous research on selective attention, we hypothesized that mature readers would allocate extra attention to important, uninteresting parts of a text because they assume it will require the most effort to learn. Conversely, they would devote the least attention to seductive details and boring trivia.

In this study, a paradigm similar to that of Wade and Adams (in press) was used to investigate the relationship between attention allocation and recall for all four categories of information--main ideas, seductive details, important factual details, and boring trivia. The text had been revised to include more sentences that might be rated as high interest/low importance and low interest/high importance. This revision, in fact, did produce a more equal distribution of sentences in each of the four categories when it was later rated for interest and importance by a group of college students. The text was then presented to another group of subjects on a computer screen, which automatically recorded the amount of time each subject spent reading individual sentences before calling up the next sentence. After reading the entire text in this way, subjects completed a short interpolated task, followed by a free written recall test.

Recall patterns were identical to the overall recall results obtained in the Wade and Adams (in press) study: seductive details were best recalled, followed by main ideas; least well recalled were important factual details. However, reading times reveal an intriguing pattern (See Table 2). Readers spent twice as much time on the important factual details than they did on main ideas or boring trivia; yet, the important factual details remained least memorable. Apparently, readers realize the need to devote extra time to important factual details, but it does not seem to be enough--at least, this information does not come readily to mind. This finding is consistent with the findings of Shirey and Reynolds (1988) and supports the hypothesis that readers are strategic in how they allocate their limited cognitive resources.

Mature readers also appear to be strategic in allocating time to main ideas and boring trivia. That is, they spend relatively little time on these two types of information, but probably for different reasons. In the case of main ideas, where interest and importance converge, they may believe that this kind of information is quite memorable, which indeed is the case. Thus, they may assume that main ideas

require a minimal amount of attention. On the other hand, readers may give little attention to information that is unimportant and uninteresting, perhaps because they assume it does not need to be learned. If these conjectures are true, then we can begin to develop a model of the mature reader as one who first discriminates between important and unimportant information, then allocates extra attention only to the important information that requires it. This model suggests that mature readers are highly efficient and strategic.

However, when it comes to seductive details, readers appear to be anything but efficient and strategic. Although seductive details were found to be the most memorable kind of information across studies, readers in this experiment spent over 50% more time reading them than they did reading main ideas, for example. Thus, vivid anecdotes and irrelevant details on topics of absolute interest inserted into a text are truly seductive because readers devote a good deal of time to information that is neither important nor difficult to remember.

[Insert Table 2 about here.]

In summary, the research on interest and selective attention reveals that strategies for learning develop with age, transcending but never fully overcoming the pervasive influence that interest has on young children. Thus, mature readers are more strategic than younger readers, focusing a good deal of attention on important factual information that is uninteresting and not easily remembered. Even though main ideas are important to remember, strategic readers devote less reading time to them, yet learn them relatively well. They also spend relatively little time on trivia that holds no inherent interest, presumably because this kind of information is not worth remembering. However, this model of efficiency and strategic decision-making breaks down when it comes to highly interesting, unimportant information. Even strategic readers appear to be seduced by this kind of information, devoting relatively large amounts of time to it, despite the fact that it is highly memorable and not important.

Why do readers spend so much time reading seductive details, and is it the same kind of attention as they devote to uninteresting factual details? Although this question needs to be investigated using different research methods, we hypothesize that readers use a qualitatively different kind of attention for seductive details than they do for factual information that they believe is important to learn. For important factual details, readers may exert concentrated effort, or *will*, which requires strong activation of attentional resources and a conscious knowledge that it will achieve some particular end such as improved recall (Norman & Shallice, 1980). In contrast, readers may spend time rereading, visualizing, thinking about, and perhaps savoring the surprise and emotional response that seductive details elicit.

Attempts to explain these findings are only conjectures at this point. More research is needed to test these hypotheses and understand why the relationship between selective attention and recall is so different for the four categories of information and how the quality of attention may vary. To do so, different research methods--both quantitative and qualitative--are needed to expand our knowledge and produce converging lines of evidence. Research methods might include verbal report data obtained by means of think alouds and interviews and other measures of attention such as reaction times to a secondary task and eye movement data.

Conclusion

This report began with the hope that the literature on text-based interest can suggest ways to make texts more interesting and at the same time make important information in them more memorable. Research findings certainly suggest what not to do, but they also offer some promising new directions.

As a result of research in this area, we know that vivid, personalized anecdotes and seductive details will usually be considered interesting. However, this is not a viable strategy for creating interest for several reasons. First, the research has consistently found that adding seductive details, or any kind of detail

unrelated to the main ideas, does not facilitate and often has a detrimental effect on the learning of important information (Bradshaw & Anderson, 1982; Garner et al., 1989; Hidi & Baird, 1988; Mohr, Glover, & Ronning, 1984; Wade & Adams, in press). Second, seductive details attract a good deal of the reader's attention, which could otherwise be devoted to essential information. Even adult skilled readers with sophisticated learning strategies direct a good deal of attention to seductive details, despite the fact that they do not need extra attention to be remembered and are not important to begin with (Wade & Schraw, 1990). Third, adding interesting but unimportant information increases passage length, as in the case of the Time-Life versions that were over 80% longer than other versions (Duffy et al., 1989). Finally, strategies for evoking emotional interest may bias readers' interpretations of events by using words and images that evoke fear and perhaps hostility. For example, images of the Vietcong *luring* U.S. servicemen and hiding razor-sharp bamboo sticks in holes present a one-sided view of the conflict, which is likely to be accepted by students as factual.

Fortunately, interest also has the potential to enhance the learning of essential information. For example, the structurally cohesive texts written by the composition teachers were not only considered more enjoyable by readers but also were recalled better than the Time-Life versions (Duffy et al., 1989). In addition, we (Wade & Adams, in press) found that main ideas in biographical text were rated as interesting and recalled relatively well. These are examples of cognitive interest, which may occur when learners are able to make sense of what they read and relate new information to their background knowledge, and when they believe that they are learning something new and worthwhile (Kintsch, 1980).

Research is now needed to fully understand why structurally cohesive texts and certain kinds of main ideas may be interesting and how findings can be applied to the writing of expository materials in different domains. One possibility is that a coherent text makes comprehension easier--and therefore more enjoyable--because it makes relations among ideas more explicit. This was a conclusion Beck, McKeown, Omanson, and Pope (1984) reached to explain why basal stories that were revised to improve their coherence were recalled better than the original versions, despite the higher readability levels of the revised stories. It was also a conclusion that Britton, Van Dusen, and Glynn (in press) reached when they found that the Time-Life passages in the Graves et al. (1988) study required the readers to make far more inferences of various kinds than did the composition teachers' versions. Having to make inferences requires time and cognitive effort, thus rendering comprehension a more controlled than automatic process. However, inferencing is only one factor that may affect comprehension and interest.

Of particular concern is how writers and teachers can increase the interestingness and memorability of important factual information. Apparently, extra reading time and even concentrated effort is not enough. In addition to being uninteresting, this kind of information may be unfamiliar and unconnected for many readers (Bransford, Stein, Shelton, & Owings, 1981). Thus, we need to continue research already underway that investigates methods for (a) focusing students' attention on both the main ideas and on important supporting details, which will require the most effort to learn, and (b) linking factual content to readers' prior knowledge and to related and superordinate concepts. One way to do this that has been found helpful is to make students aware of the "signals" in texts--such as previews, summaries, and adjunct questions--which cue readers to important information (Armbruster, 1984; Meyer, 1979). Another way is to introduce strategies for organizing information that show the relationships between main ideas and supporting details (cf., Holly & Dansereau, 1984). Such interconnectedness can help readers understand how ideas are related and the significance or relevance of facts. The more connected knowledge is in memory, the easier it is to access in new situations (Spiro, Vispoel, Schmitz, Samarapungavan, & Boerger, 1987). Thus, connected knowledge is usable knowledge.

Finally, research on text-based interest needs to be conducted with different populations of readers. We need to know how readers' strategies for dealing with information that varies in interest and importance develop with age and reading ability. We also need to know how gender, amount of relevant background knowledge, and differences in cultural background affect what is considered interesting in

a text, what kinds of information are memorable, and how interest affects selective attention strategies for learning important information.

In summary, rather than focusing on topics, words, and writing techniques that arouse emotional interest, strategies are needed that increase cognitive interest. Otherwise, nuggets and seductive details may characterize a whole new generation of textbooks. The result may be texts that are longer, that contain more irrelevant detail, and that may be more biased as well. Thus, contrary to writers' best intentions, students may be reading more but learning less.

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Table 1

Means and Standard Deviations for Overall Recall (Wade & Adams, 1989)

Sentence Type	Immediate	Delayed
High Int/High Imp* (Main ideas)		
M	4.60	3.24
SD	1.27	1.26
High Int/Low Imp (Seductive details)		
M	6.5	4.88
SD	1.74	1.52
Low Int/High Imp (Important factual details)		
M	2.90	1.05
SD	1.59	1.03
Low Int/Low Imp (Boring trivia)		
M	3.49	2.16
SD	1.24	1.10

*Int = Interest; Imp = Importance

Note: Total possible recall equals 10. Of the 112 sentences in the text, 80 were analyzed. Selection was based on the mean scores for both importance and interest that were closest to either 1 (lowest in importance and interest) or 4 (highest in importance and interest). Thus, the sentences that were not used in the analysis were those with the least agreement among subjects in the rating study or that were rated as being in the middle of the rating scale--that is, close to the 2.5 median. To reflect the proportional differences that exist in each category, 30 high importance/high interest, 10 high importance/low interest, 10 low importance/high interest, and 30 low importance/low interest sentences were selected for analysis. The data in categories containing 30 sentences were divided by 3 in order to make all recall conditions numerically equivalent. Post hoc analyses revealed that the means in each sentence category for overall recall were significantly different (Newman-Keuls, $p < .05$).

Table 2

Means and Standard Deviations for Overall Recall and Reading Times (Wade & Schraw, 1990)

Sentence Type	Recall	Reading Times
High Int/High Imp* (Main ideas)		
M	9.81	5.39
SD	3.59	1.49
High Int/Low Imp (Seductive details)		
M	14.40	8.33
SD	3.61	1.72
Low Int/High Imp (Important factual details)		
M	4.95	10.23
SD	3.56	2.32
Low Int/Low Imp (Boring trivia)		
M	6.18	5.41
SD	3.18	1.50

*Int = Interest; Imp = Importance

Note: Total possible recall equals 26; reading times are recorded in seconds. Of the 150 sentences in the text, 99 were used in the analysis. Selection criteria were as follows: To be considered high or low, a sentence's mean rating for interest and importance had to be at least 1/3 of a standard deviation above or below the grand mean of 2.5. In addition, for the categories of high interest/high importance and low interest/low importance, the means for both interest and importance could be no more than one standard deviation apart. For the categories of high interest/low importance and low interest/high importance, the two means for each sentence had to be at least one standard deviation apart. The result was 26 sentences in each category except for high interest/low importance, which contained 21 sentences. The data in this category was multiplied by 1.23 in order to equate all cells. Post hoc analyses revealed that the means for both recall and reading times were significantly different (Newman-Keuls, $p < .05$), except for the difference in recall between low interest/high importance and low interest/low importance and the difference in reading times between high interest/high importance and low interest/low importance.